

## Attachment K



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(54) FATIGUE RELIEVING SUPPORT FOR  
STEERING WHEELS AND THE LIKE

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(76) Inventor: Douglas B. Wilson, Cohasset, MA (US)

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Correspondence Address:

HALE AND DORR, LLP  
60 STATE STREET  
BOSTON, MA 02109

(57)

ABSTRACT

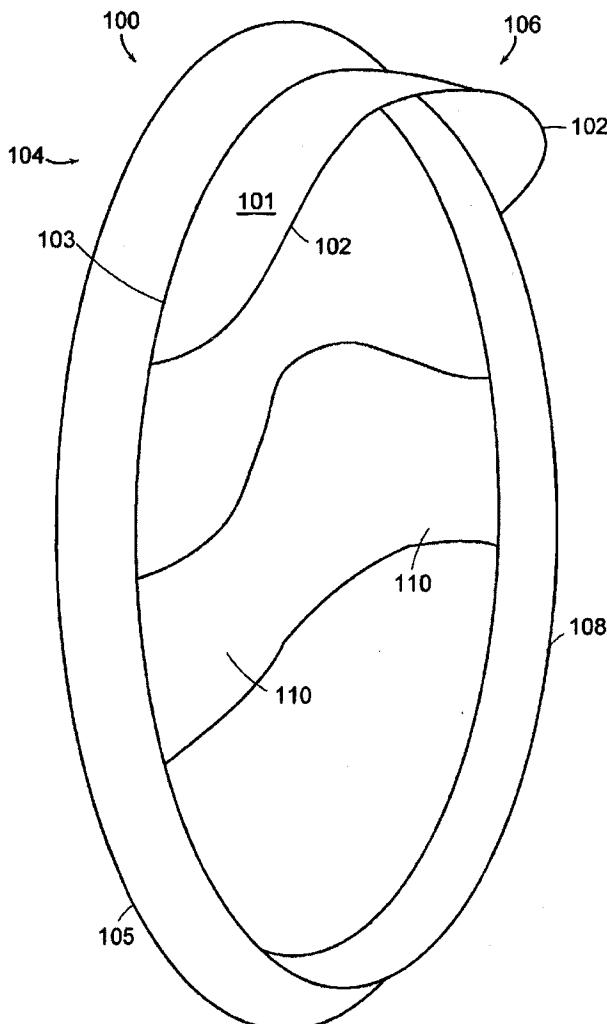
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A system and method for relieving and preventing fatigue caused by extended gripping of a vehicle/vessel steering wheel. The system includes a first section that attaches to the rim of the steering wheel at a predetermined location and a deformable second section that connects to, and extends outwardly from, the first section. The deformable second section supports a portion of the body such as wrists, hands, and forearms.

(22) Filed: Nov. 24, 2003

Related U.S. Application Data

(60) Provisional application No. 60/429,130, filed on Nov. 26, 2002.



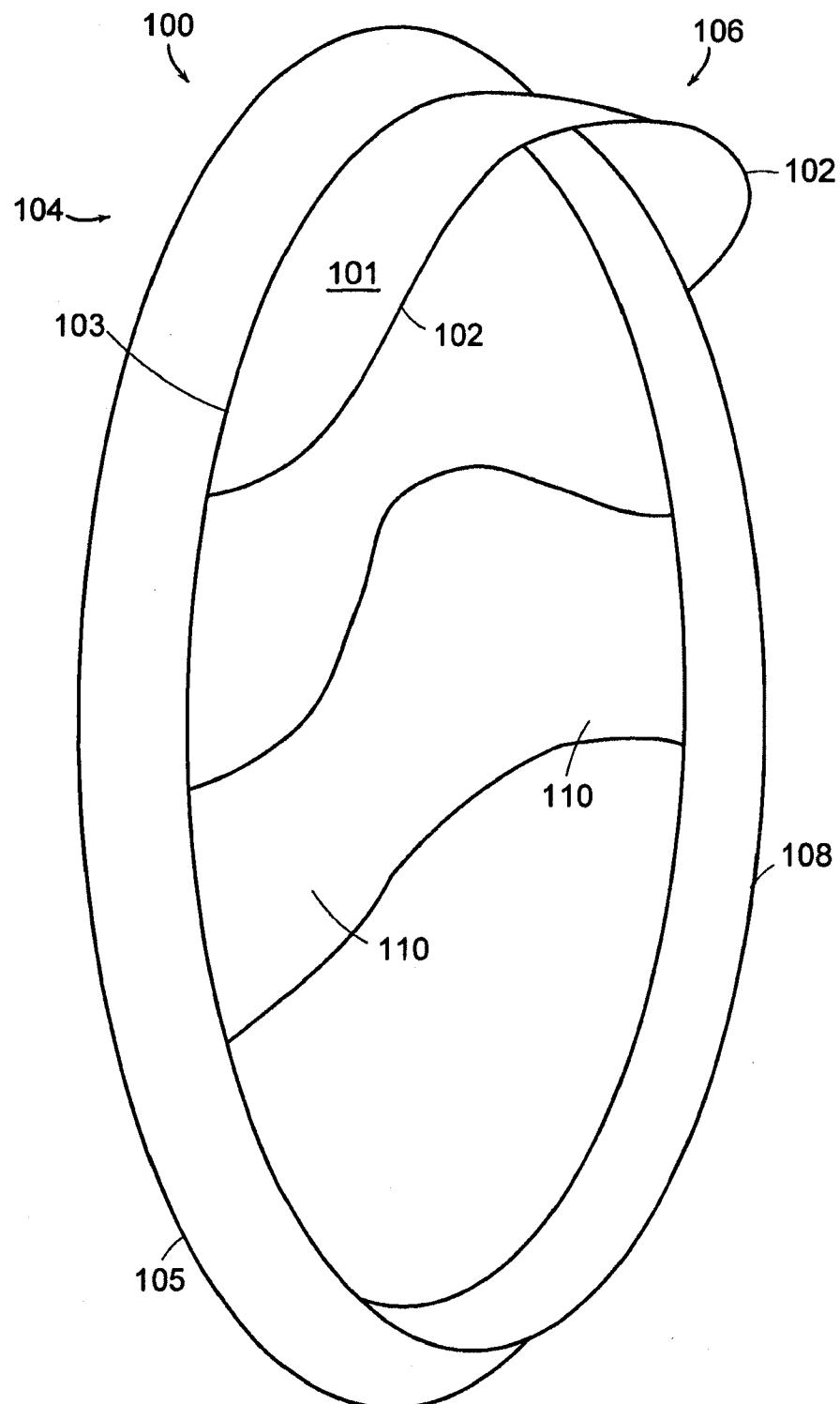


FIG. 1

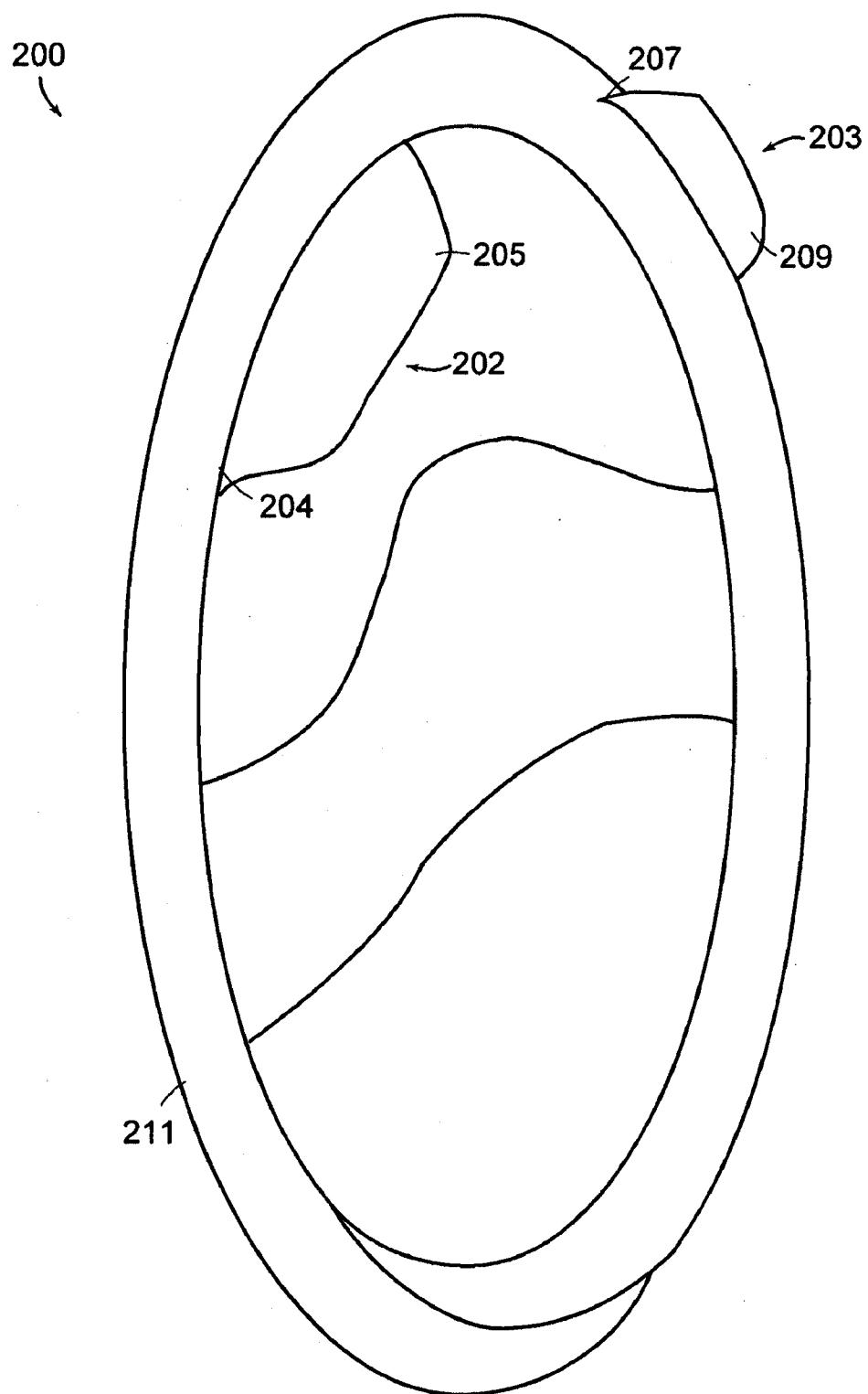


FIG. 2

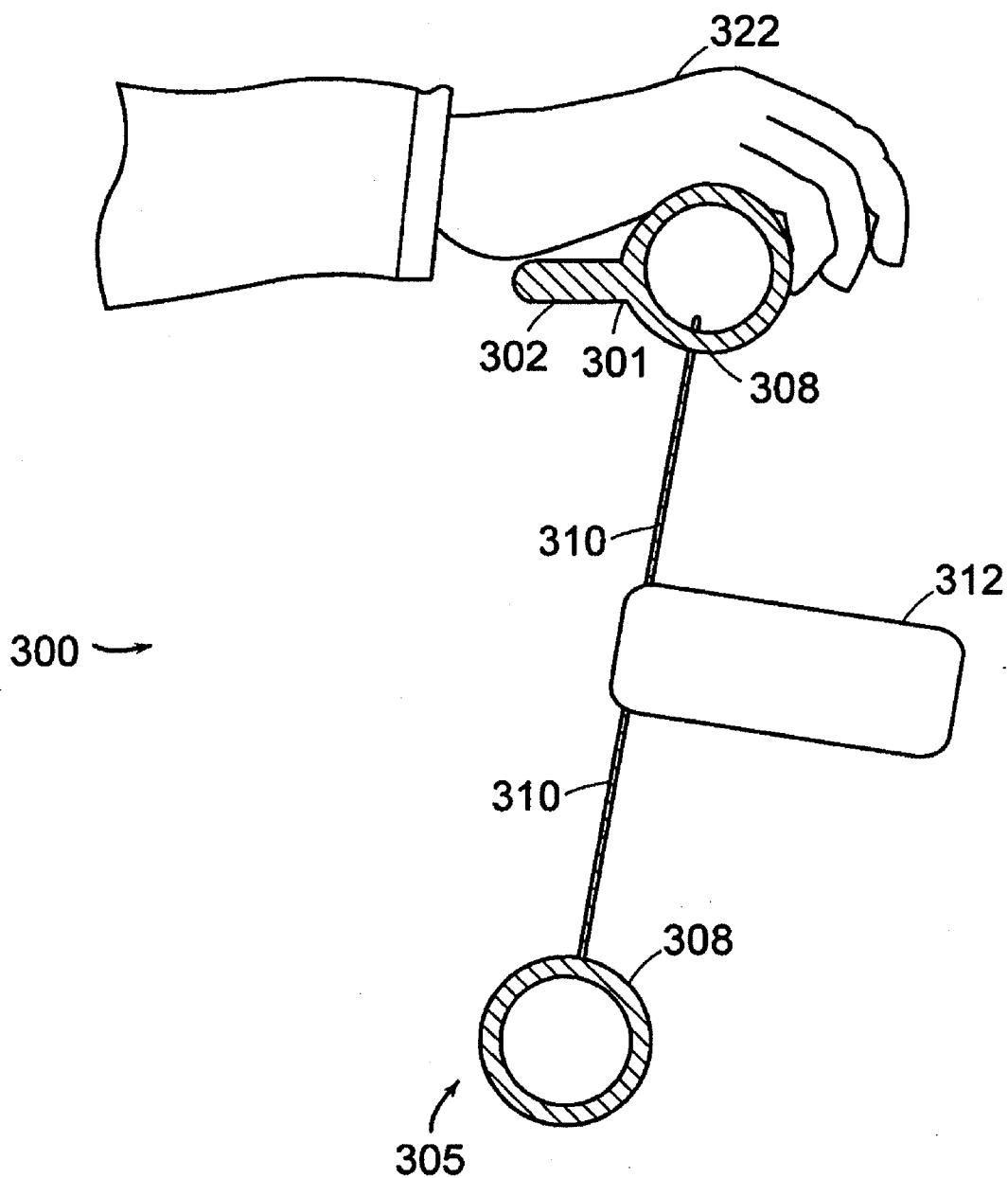


FIG. 3

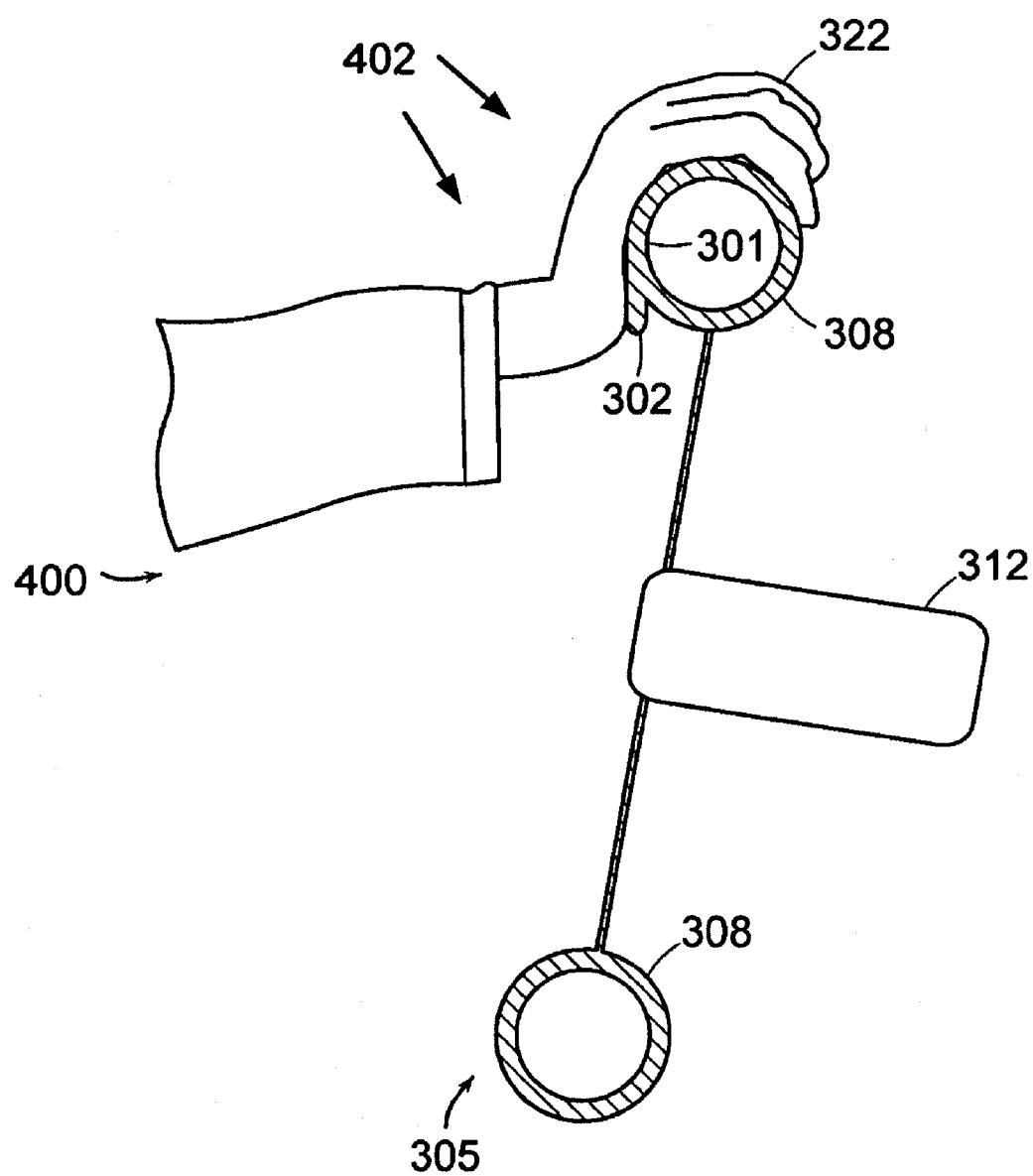
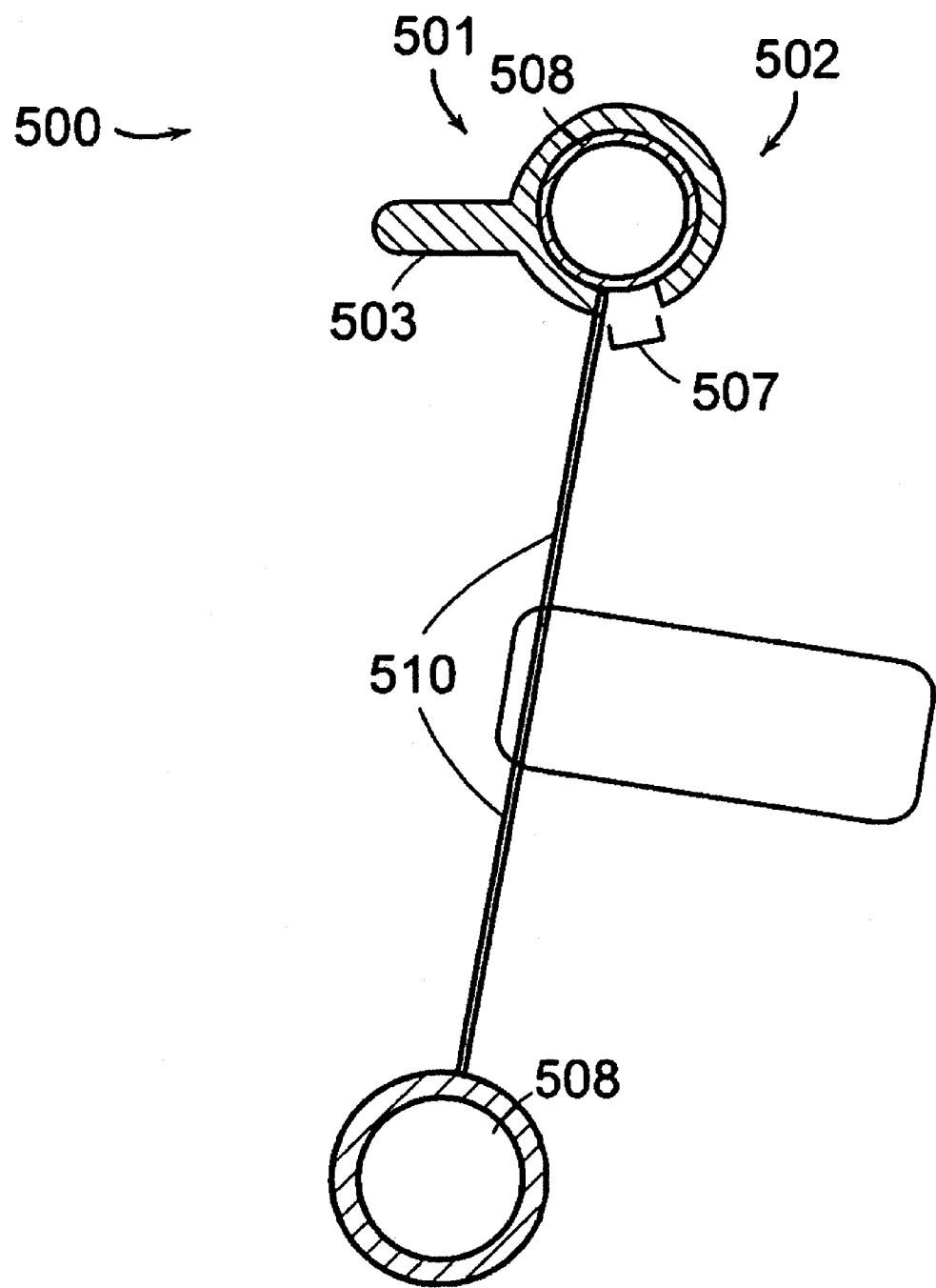


FIG. 4

**FIG. 5**

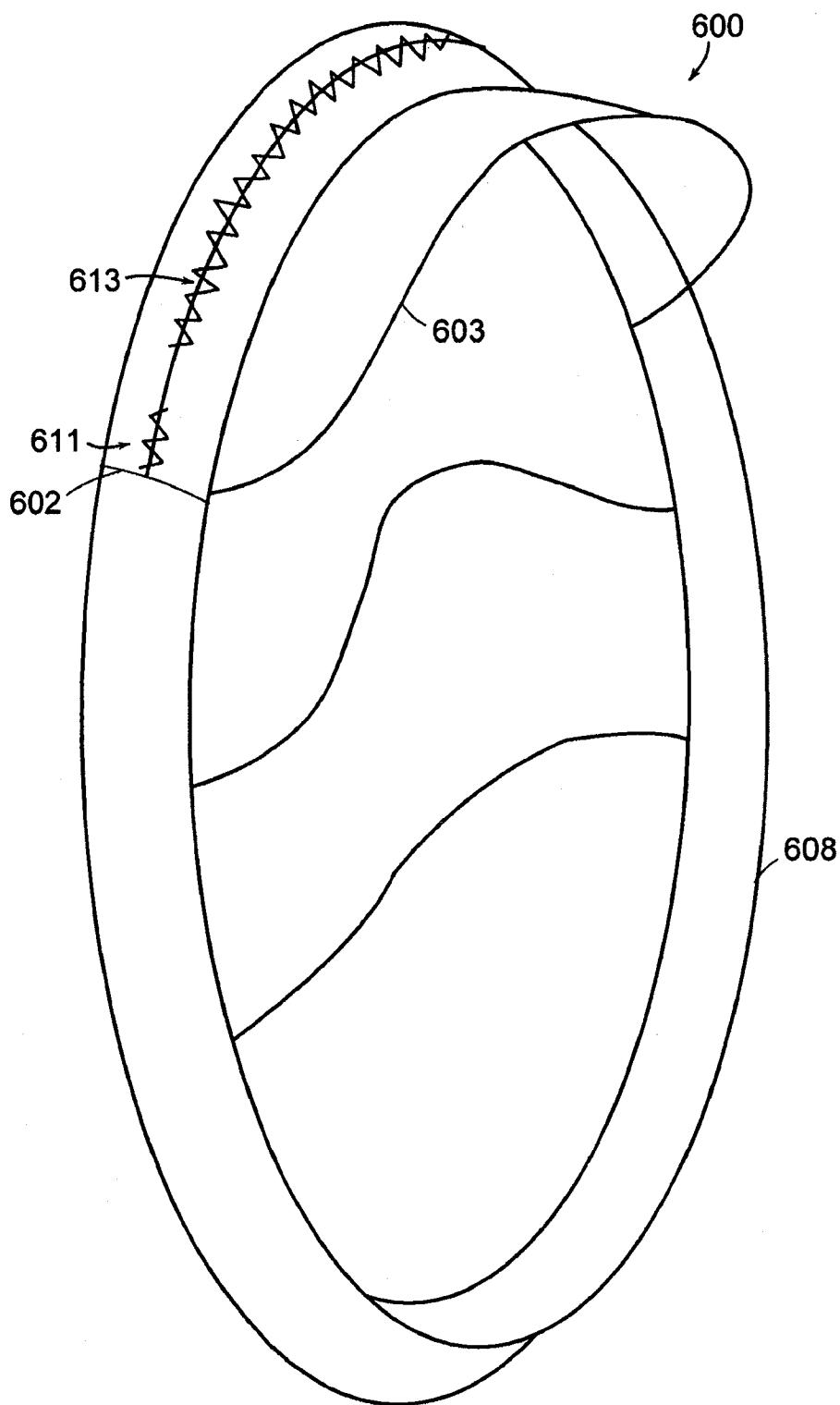


FIG. 6

## FATIGUE RELIEVING SUPPORT FOR STEERING WHEELS AND THE LIKE

### RELATED APPLICATIONS

[0001] This application claims the benefit of priority under 35 U.S.C. § 119(e) from U.S. Provisional Application Serial No. 60/429,130 filed Nov. 26, 2002, entitled "Fatigue Relieving Support for Steering Wheels and the Like", which is incorporated herein by reference.

### FIELD OF THE INVENTION

[0002] The present invention relates to systems and methods that may be used by vehicle and vessel operators to relieve and/or prevent fatigue in the arms and hands when operating directional controls.

### BACKGROUND OF THE INVENTION

[0003] In learning to drive, a person is taught that the preferable placement of the hands with respect to a steering wheel is at the ten and two o'clock (i.e., 10:00 and 2:00) positions. These hand locations are said to give the driver the best control of the operation of the vehicle, which includes automobiles, trucks, tractors, or other types of vehicles with steering wheels, as well as nautical vessels and aircraft.

[0004] If the arms and hands are held on the steering wheel at these locations for extended periods of time, they become fatigued. To relieve this fatigue, often they are removed from the steering wheel and rotated, shaken, or exercised in some way to reenergize them.

[0005] In the fatigued state, the arms and hands feel very stiff and less mobile. Further, in the fatigued condition, the ability of the arms and hands to rapidly react to emergency situations and properly control the vehicle is greatly reduced and accidents are more likely to occur. This problem arises in any vehicle or vessel and is not restricted to automobiles nor automobile-type steering controls.

[0006] There needs to be a system that will prevent and/or relieve this fatigue, yet not interfere with the operator's ability to control the vehicle or vessel.

### SUMMARY OF THE INVENTION

[0007] The present invention is a system and method that is associated with a steering wheel or vehicular directional control that relieves or prevents fatigue, for example, when operator drives for extended periods of time. The system of the present invention may be formed integral with, or attached to, the wheel or control. Each embodiment of the system will provide support to at least a portion of the vehicle or vessel operator's body so as to relieve or prevent fatigue.

[0008] The system of the present invention will include at least one part that is at least partially deformable in at least one direction, so that the system will not interfere with the operation of the wheel or control. This deformability, however, will not impede the support function of the system of the invention. Furthermore, the deformable material has memory, so that after a deforming force is removed, it resumes its original, pre-deformation configuration and shape.

[0009] It is an object of the present invention to have a system and method that may be implemented with the steering control of a vehicle or vessel to prevent or lessen the amount of fatigue that occurs in the arms and hands from driving or steering over extended periods of time.

[0010] The features and advantages of the present invention will be more readily apparent and understood from the following detailed description of the invention, which should be understood in conjunction with the accompanying drawings and claims that are appended to the end of the detailed description.

### BRIEF DESCRIPTION OF THE DRAWINGS

[0011] FIG. 1 is a perspective view of a steering wheel with an embodiment of the system of the present invention associated with it.

[0012] FIG. 2 is a perspective view of a steering wheel with multiple systems of an embodiment of the present invention associated with the steering wheel.

[0013] FIG. 3 is a cross-section of the steering wheel shown on FIG. 1, with an operator's hand resting on an embodiment of the system of the present invention.

[0014] FIG. 4 is a cross-section of the steering wheel of FIG. 1, with an operator's hand firmly grasping the steering wheel as in an emergency situation that deforms the system of the present invention.

[0015] FIG. 5 is a cross-section of another embodiment of the system of the present invention, in which the system snaps or clips onto the steering wheel.

[0016] FIG. 6 is a perspective view of another embodiment of the system of the present invention, in which the system envelops the steering wheel rim and is fastened in place.

### DETAILED DESCRIPTION

[0017] For purposes of illustration only, and not to limit the scope of the present invention, the invention will be explained with reference to the specific steering wheel examples indicated in the drawings. One skilled in the art would understand that the present invention is not limited to the specific examples disclosed and can be more generally applied to other transport means having different steering controls than those disclosed.

[0018] Referring to FIG. 1, generally at 100, an embodiment of system 101 of the present invention is shown attached to steering control 105. System 101 includes first section 103 that connects to steering control 105 and deformable second section 102. First section 103 may be formed from a rigid, semi-rigid, or deformable material. If it is deformable, it may have memory. Second section 102 that connects to first section 103 may be formed from a deformable material that has memory.

[0019] Deformable material 102 extends outward from steering control 105 over a predetermined section of the steering control which is shown in FIG. 1 to be an arc. Deformable second section 102 may extend outwardly from the steering control at or below the inside circumference of the control over the predetermined arc. This arc will typi-

cally include at least the ten **104** and two **106** o'clock positions, or may include the entire circumference.

[0020] Steering control **105** may be a normal steering wheel, with a rim **108** and spokes **110**. Alternatively, the steering control **105** may take on other forms as is known to those in the art, i.e., an aircraft yoke.

[0021] In FIG. 2, generally at **200**, steering control **211** has two systems of the present invention associated with it. The first is shown at **202** and the second at **203**. The first and second systems in FIG. 2, extend over a smaller arc of the steering control compared to the single system shown in FIG. 1.

[0022] The first system of the present invention at **202** includes first section **204** that connects to steering control **211** and second section **205** that extends outward from first section **204**. First section **204** may be rigid, semi-rigid, or deformable, while second section **205** is deformable. If the first section is deformable, it may have memory.

[0023] Similarly, the second system of the present invention at **203** includes first section **207** that connects to steering control **211** and second section **209** that extends outward from first section **207**. First section **207** may be rigid, semi-rigid, or deformable, while second section **209** is deformable. Again, if the first section is deformable, it may have memory.

[0024] In FIG. 2, system **202** is at or near the ten o'clock position and system **203** is shown at or near the two o'clock position. Although, the two systems have been described as being positioned at the ten and two o'clock locations, it is understood that they may be placed at other locations around the rim and there may be more than two systems and still be within the scope of the present invention.

[0025] Referring to FIGS. 1 and 2, first section **103** in FIG. 1, and first sections **204** and **207** in FIG. 2, may be formed integral with steering control **105** and **211**, respectively. Given that the system is disposed at or below the inside circumference of the steering wheel, in this configuration, the operator can securely grip the steering wheel over the system when the wrists or portions of the hands are resting on the deformable second section. Further, the first section may be constituted as an interface to which the second section attaches.

[0026] Referring to FIG. 3, generally at **300**, steering control **305** is shown that includes rim **308**, spokes **310**, and steering column **312**. First section **301** is formed integral with rim **308** and deformable second section **302** extends outward from the first section. The material of second section **302** has sufficient strength that when driving, the driver may rest his/her wrists or portions of the hands **322** on the material and they will be supported. The structure is such that the weight of the arms and hands through the wrists or portions of the hands are supported without the material deforming.

[0027] When the wrists or portions of the hands are supported, as shown in FIG. 3, the driver can firmly grip the steering control rim **308** over first section **301** in a manner that he or she has full control of the vehicle. Deformable second section **302** is easily deformable in a direction opposite to which it provides support or any other direction if a sufficient deforming force is applied to second section

**302**. Therefore, if the driver should grip the steering control by pushing the material upwardly, it will readily deform to permit such a grip. Also, as shown in FIG. 4, generally at **400**, if the driver should grip the steering wheel control rim **308** by grasping it such that deformable second section **302** is compressed toward, or below the interior circumference of, the steering control, it will readily compress and be deformed in such a manner that the driver can grip the steering wheel. Arrows **402** represent the force applied by the driver to the steering wheel control rim **308**, resulting in the deformation of second section **302**. Second section **302** is deformed in this manner so that it will not affect the driver's ability to grasp the steering control in any emergency situation.

[0028] Deformable section **302** has memory such that after deforming pressure is removed, it will return to its original position. When this is done, the system of the present invention will appear as shown in FIGS. 1, 2, or 3. Once the deformable second section has returned to its original position, it will again be in condition to support the arms and hands through the wrists or portions of the hands resting on the deformable second section.

[0029] Referring to FIG. 5, generally at **500**, a second embodiment of the present invention is shown. System **501** of the present invention shown in FIG. 5 includes a first section **502** that detachably connects to steering control rim. Deformable second section **503** connects to, and extends outwardly from, first section **502**. First section **502** may snap-on or otherwise attach to the steering control such that it may appear integral with the steering control. One of many possible known means for accomplishing this is by first section **502** being mostly rigid, and leaving a space **507** so the attachment can be forced over rim **508** and leave room for the steering control spokes **510**. Regardless of the means for attachment, once first section **502** is attached to the steering control, it will provide all of the benefits that have been described for the first section being integrally formed with the rim. Additionally, the second embodiment, may be a single structure with a single resting material support, a single structure with multiple resting supports, or multiple structures each with its own resting support.

[0030] By way of example, FIG. 6, generally at **600**, shows another alternate method to attach the system of the present invention to steering control rim **608**. The system in this figure has first section **602** that will envelop rim **608**. First section **602** may be made from a flexible material. First section **602** may have a slit **611** which after this section envelopes the rim may be stitched shut by stitches **613**. As in the other embodiments of the present invention, deformable second section **603** connects to, and extends outwardly from, first section **602**.

[0031] It is understood by those skilled in the arts that the system can be adjusted in terms of size and orientation to adapt to different operator sizes and preferences.

[0032] Having described the embodiments of the invention, it should be apparent that various combinations of the embodiments may be made or modifications added thereto as is known to those skilled in the art without departing from the spirit and scope of the invention, which is defined in the claims below.

What is claimed is:

1. A fatigue relieving/preventing apparatus associated with vehicular control means comprising:
  - a first section that connects to a predetermined portion of the vehicular control means; and
  - a deformable section that connects to the first section that is capable of supporting at least a portion of a vehicular operator's body.
2. The apparatus as recited in claim 1, wherein the deformable second section is deformable in at least one direction when deforming pressure is applied to such deformable second section.
3. The apparatus as recited in claim 1, wherein the deformable second section supports a portion of the vehicular operator's body when pressure from such body portion is applied in at least one direction.
4. The apparatus as recited in claim 1, wherein the vehicular control means is capable of controlling at least a nautical vessel, aircraft, or ground transportation vehicle.
5. The apparatus as recited in claim 1, wherein the deformable second section will return to an original first position after deforming pressure is removed therefrom.
6. The apparatus as recited in claim 1, wherein the portion of the body supported by the deformable second section includes at least a forearm, wrist, or hand.
7. The apparatus as recited in claim 1, wherein the first section extends a length of a predetermined portion of the vehicular control means.
8. The apparatus as recited in claim 1, wherein the deformable second section includes at least two deformable second sections that each connect to the first section.
9. The apparatus as recited in claim 1 or 8, wherein the first section is deformable.
10. A fatigue relieving/preventing apparatus associated with a vehicular control means, comprising:
  - at least two discrete first sections that each connect to a predetermined portion of the vehicular control means, and
  - a discrete deformable second section that connects to each first section.
  11. The apparatus as recited in claim 10, wherein each deformable second section is deformable in at least one direction when deforming pressure is applied to each discrete such deformable second section.
  12. The apparatus as recited in claim 10, wherein each deformable second section supports a portion of the vehicular operator's body when pressure from such body portion is applied to it in at least one direction.
  13. The apparatus as recited in claim 10, wherein the vehicular control means is capable of controlling at least a nautical vessel, aircraft or ground transportation vehicle.
  14. The apparatus as recited in claim 10, wherein each deformable second section will return to an original first position after deforming pressure is removed therefrom.
  15. The apparatus as recited in claim 10, wherein the portion of the body supported by the deformable second section includes at least a forearm, wrist, or hand.
  16. The apparatus as recited in claim 6 or 15, wherein the apparatus is adjustable for supporting different sizes or types of body portions.
  17. The apparatus as recited in claim 1 or 10, wherein each first section is capable of being formed integral with the vehicular control means.
  18. The apparatus as recited in claim 1 or 10, wherein each first section is capable of being detached from the vehicular control means.
  19. The apparatus as recited in claim 10, wherein each first section is deformable.

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